SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Services, Missions, Operations and Facilities (2)

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LAUNCHER-SPACECRAFT INTEGRATED ORBITING SYSTEM FOR HIGHER MISSION SUCCESS AND PERFORMANCE

Abstract

As the European space industry leader, EADS Astrium provides products and services covering the whole life cycle of space systems from integration to launch and in-orbit operation. Each Business Unit is specialized in a different segment: Astrium Space Transportation is the leading actor for launch segment in Europe as the industrial prime contractor for Ariane 5 Programme ; Astrium Satellites designs and manufactures space segments for all kinds of applications, together with the associated ground segment ; and Astrium Services is a growing company in space service for secure communications. Taking advantage from EADS Astrium expertise as launch system and satellite provider, this paper presents a way of increasing the global performance of the space system as a whole by merging the different segments and the advantages of this approach.

Considering the launch system and satellite as a single integrated orbiting system opens new possibilities of sharing performance and mission success rate between the launcher and the satellite. The goal of the study presented in this paper is to optimise the relationship between launcher and payload with two main ideas: - Consider the satellite as the last stage of the orbiting system and optimise the global staging in order to maximise the payload lifetime in orbit taking into account new constraints coming from the space law (deorbitation of upper stage, forbidden zones, less debris in orbits) - Consider the launcher performance reserve as a waste for the global system and find a way to convert it as much as possible into satellite lifetime when available.

The synergies identified during the study between spacecraft and launcher allows increasing the global performance and/or the mission success rate significantly. The potential gain of performance is important but the feasibility in terms of spacecraft mission analysis is challenging, in particular in the tracking network management for the first raising manoeuvres.